12.3.138 v.2 8-18-95

Table 4
(continued)

COMBUSTION UNITS

No. 2 Oil

CHARACTERISTICS OF OUTPUT				
	Chemical Composition			
	Material	Min. Value Expected lb/hr	Avg. Value Expected lb/hr	Design Maximum lb/hr
Flue Gas Released	1. CO	No. 2 oil emissions based on: 0.01% (max. by weight) - Ash; 0.05% (max. by weight) - Fuel-bound Nitrogen; 0.5% (max. by weight) - Sulfur		1.757
	2. NOx			4.655
	3. SOx			12.930
	4. HC/VOCs			0.753
	5. PM			0.626

Temperature at Stack Exit °F	Total Flow Rate (lb/hr) Minimum Expected	Total Flow Rate (lb/hr) Maximum Expected	Velocity at Stack Exit (ft/sec) Minimum Expected	Velocity at Stack Exit (ft/sec) Maximum Expected
417		22,635		44.2

COMBUSTION UNIT CHARACTERISTICS		
Chamber Volume from Drawing ft^3	Chamber Velocity at Average Chamber Temperature ft/sec	Average Chamber Temperature °F
189.75	40.48	2365
Average Residence Time sec	Exhaust Stack Height ft	Exhaust Stack Diameter ft
0.42	NA	2

ADDITIONAL INFORMATION FOR CATALYTIC COMBUSTION UNITS		
Number and Type of Catalyst Elements	Catalytic Bed Velocity ft/sec	Max. Flow Rate per Catalytic Unit (Manufacturer's Specifications) Specify Units

Attach separate sheets as necessary providing a description of the combustion unit, including details regarding principle operation and the basis for calculating its efficiency. Supply an assembly drawing, dimensioned and to scale, to show clearly design and operation of the equipment. If the device has bypasses, safety valves, etc., specify when such bypasses are to be u and under what conditions. Submit explanations on controls for temperature, air flow rates, fuel rates, and other opera variables.

TABLE 6
BOILERS AND HEATERS

Point Number (from flow diagram)	Manufacturer: CLEAVER - BROOKS
Type of Device: Boiler	Model Number: CB(LE)200-600-200ST

CHARACTERISTICS OF INPUT

Type Fuel	Chemical Composition (% by weight)	Inlet Air Temp (°F) (after preheat)	Fuel Flow Rate (scfm* or lbs/hr)	
NATURAL GAS	CONTACT LOCAL GAS SUPPLIER OR UTILITY FOR TYPICAL GAS ANALYSIS.	—	Average	Design Maximum: 418 SCFM
		Gross Heating Value of Fuel	Total Air Supplied and Excess Air	
		(specify units): 1000 Btu/SCF	Average: ____ scfm* 15 % excess (vol)	Design Maximum: 5100 scfm* 20 % excess (vol)

HEAT TRANSFER MEDIUM

Type of Transfer Medium	Temperature (°F)		Pressure (psia)		Flow Rate (specify units)	
(water, oil, etc.)	Input	Output	Input	Output	Average	Design Max
WATER	70	380	AT LEAST 185	180		20,700 lb STEAM @ 212°F.

OPERATING CHARACTERISTICS

Average Fire Box Temp. at Max. Firing Rate	Fire Box Volume (ft^3) (from drawing)	Gas Velocity in Fire Box (ft/sec) at Max. Firing Rate	Residence Time in Fire Box at Max. Firing Rate (sec)
2,165	187.75	38.67	0.44

STACK PARAMETERS

Stack Diameters	Stack Height	Stack Gas Velocity (ft/sec)		Stack Gas	Exhaust
		(@ Avg. Fuel Flow Rate)	(@ Max. Fuel Flow Rate)	Temp (°F)	scfm
2' AT BOILER EXIT			43.0	417	4,894

CHARACTERISTICS OF OUTPUT

Material	Chemical Composition of Exit Gas Released (% by volume)
CO_2	8.6%
O_2	2.5%
N_2	72.98
H_2O	15.9 %

Please attach an explanation of how temperature, air flow rate, excess air, or other operating variables are controlled.

Also supply an assembly drawing, dimensioned and to-scale, in plan, elevation, and as many sections as needed to clearly show operation of the combustion unit. Show interior dimensions and features of the equipment necessary to calculate in performance.

*Standard Conditions: 70°F, 14.7 psia.

TABLE 6

BOILERS AND HEATERS

Point Number (from flow diagram)	Manufacturer: CLEAVER-BROOKS
Type of Device: Boiler	Model Number: CB(LE)200-600-200ST

CHARACTERISTICS OF INPUT

Type Fuel	Chemical Composition (% by weight)	Inlet Air Temp (°F) (after preheat)	Fuel Flow Rate (scfm* or lbs/hr)	
No. 2 oil (Diesel)	OBTAIN FROM OIL SUPPLIER.	—	Average	Design Maximum: 1,300 lb/hr
		Gross Heating Value of Fuel	Total Air Supplied and Excess Air	
		(specify units): 140,000 Btu/gal	Average: ___ scfm*; 15 % excess (vol)	Design Maximum: 5100 scfm*; 20 % excess (vol)

HEAT TRANSFER MEDIUM

Type of Transfer Medium	Temperature (°F)		Pressure (psia)		Flow Rate (specify units)	
(water, oil, etc.)	Input	Output	Input	Output	Average	Design Max
WATER	70	380	AT LEAST 185	180		20,700 lb STEAM @ 212° F

OPERATING CHARACTERISTICS

Average Fire Box Temp. at Max. Firing Rate	Fire Box Volume (ft³) (from drawing)	Gas Velocity in Fire Box (ft/sec) at Max. Firing Rate	Residence Time in Fire Box at Max. Firing Rate (sec)
2,165	187.75	40.48	0.42

STACK PARAMETERS

Stack Diameters	Stack Height	Stack Gas Velocity (ft/sec)		Stack Gas	Exhaust
		(@ Avg. Fuel Flow Rate)	(@ Max. Fuel Flow Rate)	Temp (°F)	scfm
2' AT BOILER EXIT			44.2	417	5,032

CHARACTERISTICS OF OUTPUT

Material	Chemical Composition of Exit Gas Released (% by volume)
CO_2	11.4%
O_2	2.5%
N_2	74.5%
H_2O	11.6%

Please attach an explanation of how temperature, air flow rate, excess air, or other operating variables are controlled.

Also supply an assembly drawing, dimensioned and to-scale, in plan, elevation, and as many sections as needed to clearly show operation of the combustion unit. Show interior dimensions and features of the equipment necessary to calculate in performance.

*Standard Conditions: 70°F, 14.7 psia.

Table 4
COMBUSTION UNITS

Please note: BACT for new boilers/ heaters ≥10 MMBH is:
0.10 lb NOx/MMBTU for gas
0.20 lb NOx/MMBTU for #2 oil
0.30 lb NOx/MMBTU for other fuel
and for ≥100 MMBH is: 10 ppm w/CEM

OPERATIONAL DATA

Number from flow diagram: Model Number (if available):

Name of device: Manufacturer:

Design heat input rating: _____ Btu/hour each Number of units:

CHARACTERISTICS OF INPUT

	Type	Grade or Spec.	% Sulfur	Annual Consumption	Units	*Rated Hourly Consumption
Fuel	Oil	No. 2 DIESEL	0.5% MAX.		(gal)	179.5 gph
	Gas	NATURAL	—		(therm)	251.0 Therm hr.
	Wood				(ton)	
	Other				( )	

Gross Heating Value of Waste Material (wet basis if applicable): _____ Btu/lb

Air Supplied for Waste Material: Minimum SCFM (70°F & 14.7 psia) _____ Maximum SCFM (70°F & 14.7 psia) _____

Waste Material or Contaminated Gas	Total Flow Rate (lb/hr) Minimum Expected	Total Flow Rate (lb/hr) Design Maximum	Inlet Temperature (°F) Minimum Expected	Inlet Temperature (°F) Design Maximum

Chemical Composition

Waste Material*	Material	Min. Value Expected lb/hr	Avg. Value Expected lb/hr	Design Maximum lb/hr
	1.			
	2.			
	3.			
	4.			
	5.			

Gross Heating Value of Fuel: _____ Btu/lb

Air Supplied for Fuel: Minimum SCFM (70°F & 14.7 psia) _____ Maximum SCFM (70°F & 14.7 psia) _____

*Describe how waste material is introduced into combustion unit on an attached sheet. Supply drawings, dimensioned and to to show clearly the design and operation of the unit.

(over)

Table 4
(continued)

COMBUSTION UNITS NATURAL GAS

CHARACTERISTICS OF OUTPUT

	Chemical Composition			
	Material	Min. Value Expected lb/hr	Avg. Value Expected lb/hr	Design Maximum lb/hr
Flue Gas Released	1. Co			0.9164
	2. NOx			0.879
	3. Sox			0.025
	4. HC/VOCs			0.402
	5. A.M.			0.251

Temperature at Stack Exit °F	Total Flow Rate (lb/hr) Minimum Expected	Total Flow Rate (lb/hr) Maximum Expected	Velocity at Stack Exit (ft/sec) Minimum Expected	Velocity at Stack Exit (ft/sec) Maximum Expected
417		22,013		43.0

COMBUSTION UNIT CHARACTERISTICS

Chamber Volume from Drawing ft^3	Chamber Velocity at Average Chamber Temperature ft/sec	Average Chamber Temperature °F
187.75	38.67	2,315
Average Residence Time sec	**Exhaust Stack Height ft**	**Exhaust Stack Diameter ft**
0.44	NA	2

ADDITIONAL INFORMATION FOR CATALYTIC COMBUSTION UNITS

Number and Type of Catalyst Elements	Catalytic Bed Velocity ft/sec	Max. Flow Rate per Catalytic Unit (Manufacturer's Specifications) Specify Units

Attach separate sheets as necessary providing a description of the combustion unit, including details regarding principle operation and the basis for calculating its efficiency. Supply an assembly drawing, dimensioned and to scale, to show clearly design and operation of the equipment. If the device has bypasses, safety valves, etc., specify when such bypasses are to be u and under what conditions. Submit explanations on controls for temperature, air flow rates, fuel rates, and other operat variables.